Week 1: Day 1

Recognize and synthesize an embedded software engineering design problem

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Introduction

- In this presentation we will address a problem that can be solved using the embedded system technology.
- Discuss the objectives and parameter that are required to be met and how the solution that we are proposing meets those parameters and objectives.

Objectives

1. Recognize and synthesize an embedded software engineering design problem
2. Choose three instances of embedded systems and discuss their limitations

Objective 1: Recognize and synthesize an embedded software engineering design problem

How do we identify the problems in a design and synthesize it?

- we will identify the niche of the market, what are the wants and expectations from developers nowadays. This can be done by researching the articles, news, social media,etc.
- Then when we have an product idea, what are the challenges and requirements of a products, and what are the solutions for them.

Advantages of indoor plants

- Air: Plants contribute to a cleaner, healthier air for us
- Humidity: One of the studies (Lohr, 2010, 2) states that foliage plants can increase the relative humidity to healthier and more comfortable levels in interior spaces
- Dust: Adding plants into the room will reduce dust by at least 20%
- Stress: Interior plants have been associated with reduced stress, increased pain tolerance, and improved people's productivity

Product idea:

Smart Indoor Plants Care System

- A device that helps indoor plants to survive without much effort from the owner.
- The device has sensors to detect the water level, humidity, and temperature, and all these parameters can be controlled by the particular plant's requirement.
- We will have a log of data of the different varieties of plant species and their requirements stored in the memory.
- We also will have a camera to monitor the Plant's health.

Why this Project?

- Many people like to keep small indoor garden inside house.
- Busy lifestyle makes it difficult to spend time to care the plants.
- This device makes it easier to care for plants and keep them healthy.
- To encourage the health benefits the indoor plants offers.

Key features of the product:

The functions of our product should includes:

- Auto-adjusting temperature:
- Auto-adjusting humidity
- Auto-watering
- Auto-disease-detect
- Light system
- Music player
- Friendly control interface
- Smartphone control

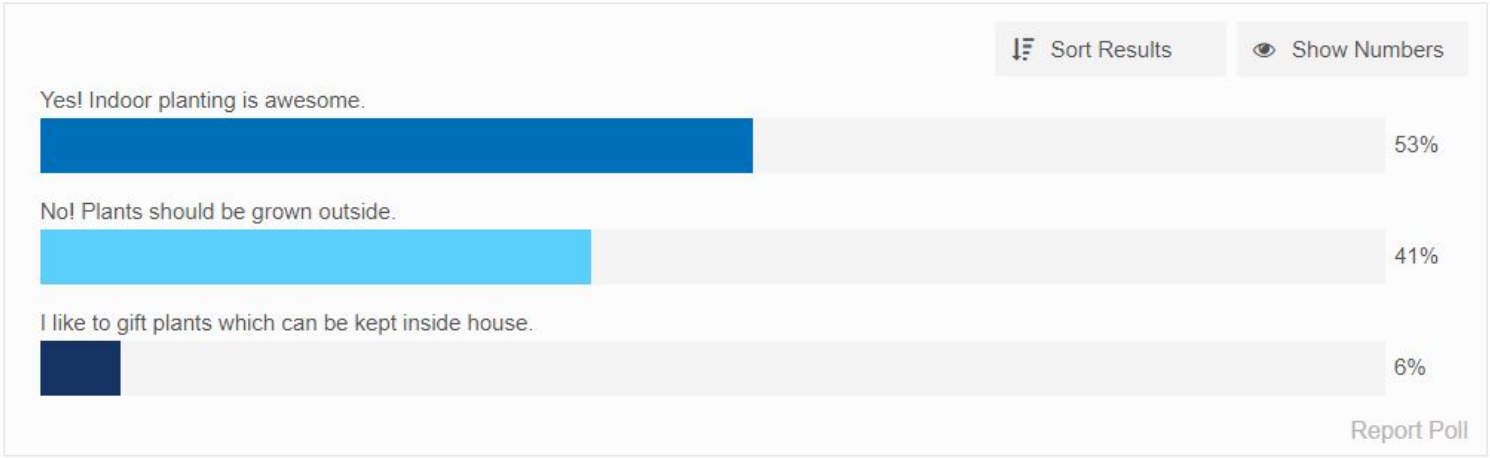
Design Requirements

1. real time operation reactive to external events
2. conform to size and weight limits
3. budget power and cooling consumption
4. satisfy safety and reliability requirements
5. meet tight cost targets
6. ensure end-product utility
7. control physical systems
8. manage power.

Survey conduct & Identify challenges:

We surveyed to find out whether people like to grow plants indoors and the results were as follows:

From the survey results, it is evident that many people like to grow plants inside. But people find it difficult to keep their plants alive inside the house. So, we need a solution to help people keep their plants healthy inside

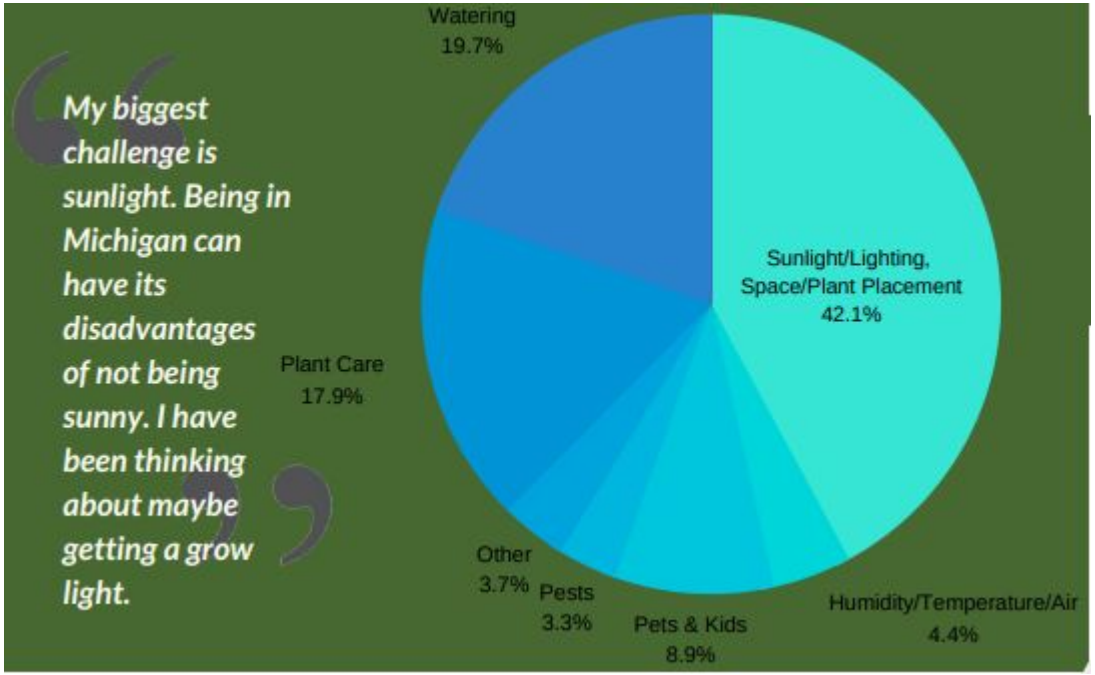


What is the difficulties for plant-lovers to grow them indoor?

1. Identify the challenges which will help to develop a product that can give a better solution.
2. For that different aspects that play a role in growth of plants need to be considered.
3. Most common issue is people find it difficult to keep the plants alive.
4. Diseases like chlorosis

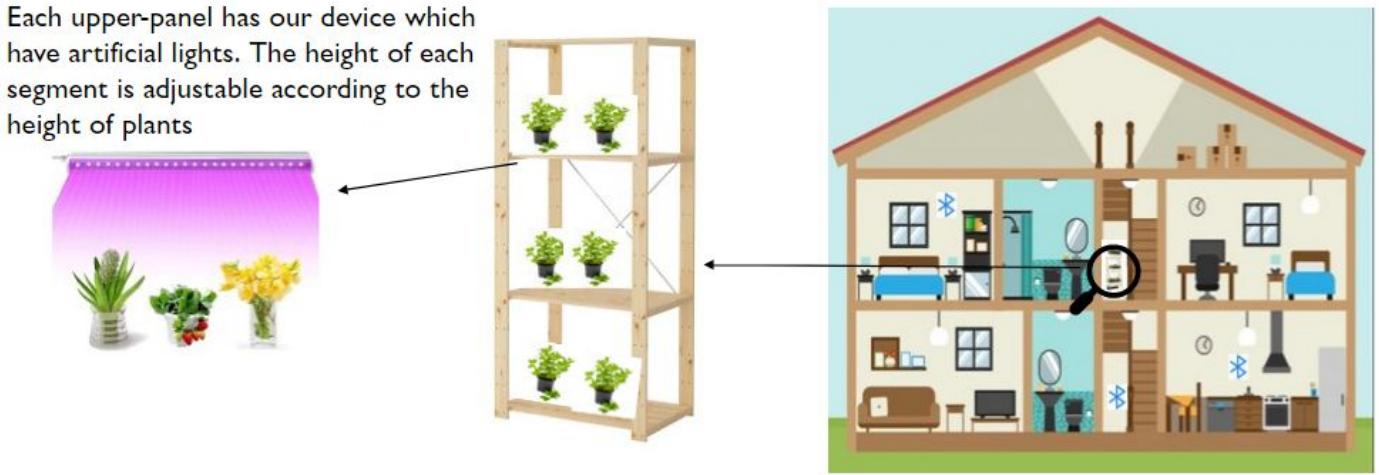
Pie chart

In this pie chart we can clearly see that the main problems that damages plants indoors are sunlight, management of space, plant care, watering and temperature



Concept design

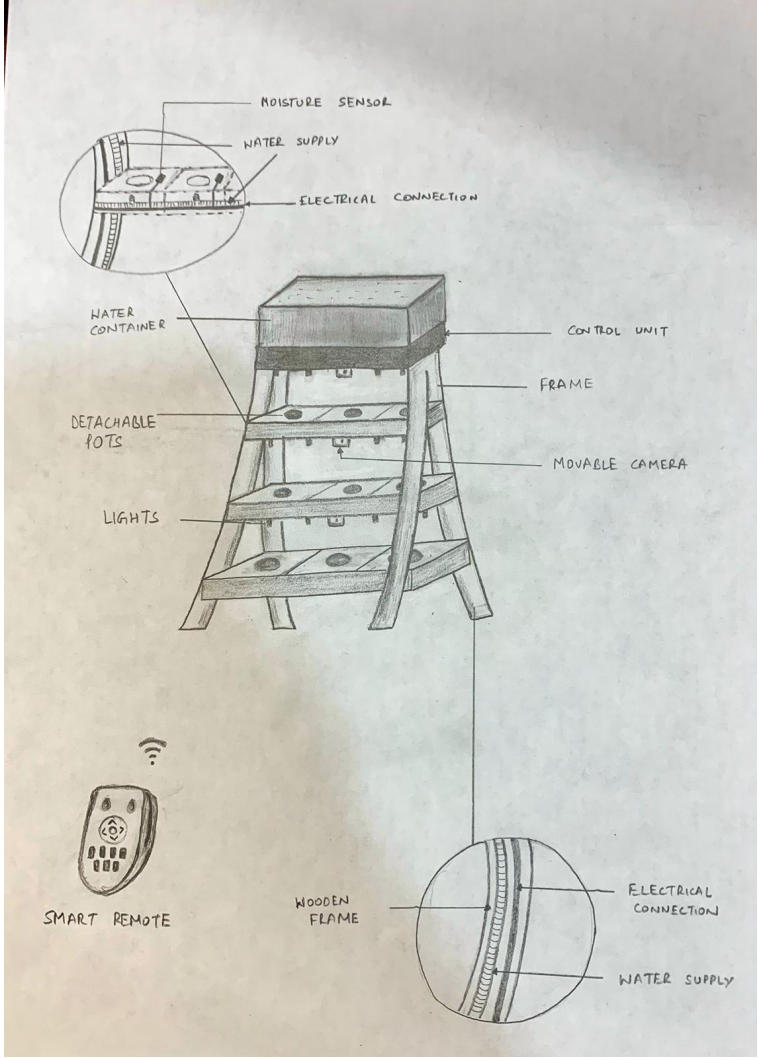
Initial idea:



Sketch of the design

Things to keep in mind when designing:

- How the product should look?
- What are the best places to put the components?



Objective 2: Choose three instances of embedded systems and discuss their limitations

From the surveys, we can conduct that the important aspects that should be considered when designing are:

1. Reactive Operation
2. Safe and Reliable
3. Controlling Physical Systems

1.Real time operation

- With the feature of disease detection.
- The device will have a camera system that scans the leaves of your plants, then detect if there is any disease happening to the plants, and give the feedback in real time.
- The light system operates base on the day/night time.

1.Real time operation

- Temperature & humidifier system works on the real time data gathered from the sensors .
- Watering system is controlled and monitor by sensing the humidity of the soil monitored by moisture sensors

2.Safe and Reliable

Safety features:

- Steady and strong design.
- 12V power supply - low power voltage.
- All electronics components are covered carefully.
- Frame made by wood - For environment friendly purpose.
- Stationary device, support by strong materials.
- Has long life time, requires less maintenance.

3.Controlling physical system

Our system can be controlled by various ways

- Directly from the monitor and control panels on the product.
- Controlling by using smart phone via BLE.
- An additional remote control.

Conclusion

- In conclusion, this product will be a friend of indoor plant lovers and can assist them very efficiently.
- This product will get attention from customers since it has reactive operation, safe and reliable and controlling physical system.


Thank
You

Survey results

: https://www.quiz-maker.com/results3497483x233B4ca1-105#tab-2

References

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